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THE TAR HEEL WASH OFF

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UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DEEP RIVER AREA

HIGH POINT, NORTH CAROLINA



LIT

U. S. Department of Agriculture
Washington, D. C.

THE STATE COORDINATOR'S MESSAGE

There is probably no greater problem confronting the people of the United States today than that of soil erosion control. Our agricultural march of time is unparalleled in the pages of literature, but the national awakening to the ravaged and despoiled areas left in its wake was much too long delayed, particularly in the Deep River and Piedmont sections of the country.

Erosion occurred in these areas hundreds of years ago, but it was of a geological form which could not outrun the processes of soil formation and development that had gone on for thousands of years.

We believe that after the long period of unwise, exploiting land use, the present awakening to the appalling menace of soil erosion to our basic industry is deep and sincere, finding voice in the Government's program now being carried out by the Soil Conservation Service. However, when viewing badly eroded areas, one can easily visualize how, by the removal of the cover of vegetation, rainfall was given the right of way to wash away valuable topsoil; how the scars on the breast of nature deepened and widened; how man, in wresting a livelihood from once fertile lands, in his lack of knowledge, took all that nature could give and returned nothing.

Today the problem of accelerated erosion is such, that it would appall one to sit down and seriously think of what could result, not during the next two centuries, but within the

space of one generation. It is estimated that the annual cost of soil erosion amounts to at least \$400,000,000 a year in directly depreciated soils, exclusive of the ultimate cost in terms of land destroyed or impoverished; the resulting silting of reservoirs, streams and harbors; the increased volume and frequency of floods; the damage to low-lying fields by overwash of infertile, erosional debris, and the impoverishment of farm populations. Further, it is impossible to compute the value of crops which now ravaged lands might have produced; or the economic loss suggested by lowered standards of living, resulting in transfer to relief rolls. Twenty billion dollars would be an under estimate.

With the leadership of federal and state departments of agriculture, and forestry, better methods of land use, calculated to check erosion, have been inaugurated on public and private lands; also experimental work has been done to determine the nature of erosion on different types of soil under varying conditions. Through the educational work of such agencies as the Soil Conservation Service, farmers have become "erosion conscious."

The Soil Conservation Service program means a new agricultural advance; the stabilizing of farming on its own base; the banishment of the threat of bankrupt farming on submarginal lands, and last, but not least, the focusing of attention, particularly that of the rising generation, on the interests of rural life.

EROSION - A TRAGEDY

I've been back to the home
I knew when a boy;
When life was a day-dream
And living a joy.
Where broad, verdant meadows
Gleamed bright as the morn,
And soft breezes rustled
The tall waving corn.

The orchard, whose shade
So inviting and cool,
Was only excelled
By the old swimming pool
That lay in the shadow
Of Carpenter's Mill
Where the stream wound along
By the foot of the hill.

Where with youthful companions
I sported all day,
In splashings delightful,
And happy, and gay.
But Time has wrought changes,
Old friends have all fled;
The mill-wheel lies broken;
The miller is dead.

The fields are quite barren;
The swimming pool's dry;
Filled up with the soil
That once nurtured the rye.
The cornfields are gullied;
The meadows are brown;
The beautiful ~~fruit~~ trees
Are broken and gone.

...

Soil erosion, the ravager,
Wrought all the harm,
By its ruinous work
On our beautiful farm.

Harmack

SOILS AND DROUGHT

The prolonged drought of early summer has clearly emphasised the importance of strip cropping and all other available means of soil conservation.

In some fields crops grew luxuriantly throughout the drought while on others the crops were irregular and parched. An examination disclosed that where the crops were good the soil was soft, friable, and moist, and where they were poor, the soil was hard, baked, and little or no organic matter was present. The good soil had been kept good by good soil management; poor soil management had left the other eroded, and depleted of its organic matter, moisture holding capacity, and some of its plant food.

The practice of strip cropping to preserve the good soil lends itself particularly well to a system of farming such as obtains in this section. It permits the growing of a reasonable acreage of clean tilled or row crops without exposing any field entirely to the serious erosion which usually accompanies clean cultivation. The hillsides are divided into strips along the contour - some strips planted to grains and close-growing crops such as lespedeza and clover; the intervening strips to corn, cotton, or other necessary row crops.

The strips of thick-growing crops spread the water otherwise lost by runoff, thus checking erosion and at the same time conserving moisture. Farmers of the Deep River area are practicing this plan of conserving soil and moisture on 3,100 acres of hillside land.

WATER CONTROL FACTOR IN CONSERVATION

Water control and conservation is the most important factor in solving the problem of soil erosion. Where rainfall has the right of way, from 10 to 60 tons per acre of the most fertile soil is washed from unprotected cultivated fields into the stream channels, resulting in the eventual abandonment of many agricultural lands.

To save farm lands from further destruction by erosion, and to bring back impoverished areas to some degree of productivity, we must return to Nature's method of conserving moisture and increasing soil fertility. The entire Soil Conservation program is directed toward this in the carrying forward of scientific practices of strip-cropping, rotations of crops, terracing and vegetative cover.

One of the major problems is the handling of water after it has reached the end of a terrace. Unless there is some form of adequate outlet, gullying will result, leading back into the field as the end of the terrace cuts deeper and deeper to form other gullies in its advance.

Although there is no one best type of terrace outlet suited for all fields needing terraces, the meadow strip type of outlet is receiving favorable approval by soil conservation experts and farmers. If properly constructed and prepared before seeding, and a good sod formed before the water is turned into the outlet, this type is proving very satisfactory.

In selecting the site for the meadow strip

outlet, several factors must be considered, however. Too steep land is not suited for this type of outlet; soil must be of a type that will produce a good strong sod of grasses and legumes sufficient to withstand the velocity of water emptied on it; the fertility of the soil should be sufficient to produce and maintain a good vegetative cover; it should be placed in the natural depression of the field if possible, or on the edge of the field to which the water would naturally drain.

The width of the strip will vary from 30 to 80 feet or more, depending on the area drained and the extent of the field the farmer desires to seed. The strip should be as flat as possible and not trough-like, so the water may spread over the width of the strip and not concentrate.

These meadow strip outlets should be built and a good vegetative cover established prior to terracing the field. Where this is not possible, however, a diversion ditch may be used along the edge of the strip until the sod is established. This is not the ideal method as such a ditch tends to wash deeper.

A well-established meadow strip outlet may be observed on the L. O. Williard farm, near the Lindale Dairy, on the south side of the Greensboro highway, about 100 yards from the Williard home. The strip extends southward from a locust tree standing at the edge of the highway.

STREAMFLOW GAGING STATIONS

Records compiled at the four streamflow gaging stations in the Deep River watershed, afford valuable scientific data respecting the relation of rainfall to soil washoff, and silting of streams and reservoirs.

The work in which the Soil Conservation Service cooperates with the U. S. Geological Survey, began in the early part of 1934, for the purpose of securing data of discharges and suspended silt load daily.

Permanent water stage records were established at four stations, i.e., West Fork of Deep River; East Fork of Deep River above the municipal reservoir; Deep River below Coletrane's mill, Randleman, and Muddy Creek, near Archdale, northeast of Glenola.

These recorders make a continuous record of the height of the water in the river. Measurements of the discharge are made at various stages by wading at low stages, and from a bridge or cable at the higher stages, and from these measurements a continuous record of the volume of water passing the gaging stations is computed. The data obtained regarding soil in suspension, makes it possible to compute in tons the amount of soil carried down the stream channels.

Samples of the water taken at intervals are analysed in the laboratory of the High Point Municipal filter plant. These samples are taken daily during periods of normal or low flow, and hourly during periods of high flow following rain; then analysed to determine the content of the

soil in suspension.

Records are also obtained from 23 wells of the various distances from the ground surface to the level of the water in the ground. In some wells the distance varies from 4 to 5 feet in late fall or early winter, to 20 or 30 feet in early summer. In other deeper wells the variation is small, with the level of water about 40 feet below ground at all seasons. The influence of droughts is clearly shown by the wells, during which period the water level falls rapidly.

The water level can be maintained at a higher stage, however, through conscientious soil conservation practices, which include the turning under of legumes and other vegetable matter, thus increasing the water-carrying capacity of the soil by absorption, affecting directly the water table in the area.

Through the generous cooperation of farmers in reading rain gages, records are obtained from 18 of the USWB standard types. The Weather Bureau records from 3 gages in or near the area are available; also continuous records are obtained from five automatic recording gages. These gages are distributed over the area, as uniformly spaced as possible, so as to provide accurate information from all sections, and give a record of intensity of rainfall as well as total amount. These rainfall records are most helpful in an intelligent use of other available data.

(See article on "HYDROLOGICAL DATA" on page 14.)

EDITORIALS

THE TARHEEL WASHOFF
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NORTH CAROLINA AREA

FEDERAL BUILDING - High Point, N. C.
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PERSPECTIVES

"To be or not to be," is the imperative question which challenges legislators in the United States today, as it did Hamlet in Shakespeare's timeless drama long ago. Our agricultural frontier is no longer on the western coast, but "underfoot." The pages of history reveal no such rapid exploitation of natural resources, or growth of population, as are recorded in the story of American colonization.

The "virginal" perspective takes us back to the time when the 50,000,000 acres, now denuded of covering and destroyed for cultivated crops by gully erosion, were areas of verdant splendor through which ran clear rivers. Then, under undisturbed native conditions, soil formation beneath the cover of vegetation exceeded the rate of soil erosion from above due to heavy rainfall and floods.

Today, one views a changed perspective which suggests some of the penalties of civilization. Into pristine areas the colonists came with energy, courage, and endurance almost unparalleled in the story of human endeavor. It was a conquest of natural resources without any definite plan, or thought of the ultimate effect of their ruthless, relentless march. Fertile areas were so vast in extent that soil impoverishment was never thought of, and before an unwavering advance agricultural horizons receded into the Pacific.

With the removal of the covers of vegetation our national soil erosion problem began, and within less than a century erosion was so accelerated that millions of acres of valuable farm land experienced a reduction and destruction of their productivity. Today, the picture of transformation represents a problem of soil erosion national in character and scope, affecting directly or indirectly every citizen of the United States.

However, another perspective is being created by the carrying out of a vast governmental program of soil conservation and erosion control. While it is impossible to turn back the clock to the remote yesterday, this program, through such agencies as the Soil Conservation Service, is directed primarily to the maintenance of the agricultural resources which remain, and, incidentally to the reclamation of wasted areas as far as possible.

In the very nature of things the vast and beneficial program of the SCS, which includes all known and tried methods of erosion control and complete land use practices, will lead to agricultural prosperity, throughout the Piedmont and other sections, in the days to come.

FARM WOODLANDS

Farmers throughout Deep River area should be giving more thought to what woodlands may mean in terms of income to be derived therefrom. This would react directly and beneficially upon the effort to control erosion in this section of North Carolina Piedmont.

In the past, the significance of woodlands has been practically eclipsed by the importance attached to cultivated crops such as corn, wheat and tobacco; because, while the farmer could estimate practically to a dollar the financial yield of his cultivated crops, the potential asset value of a properly managed woodland was something altogether beyond his reckoning.

According to the 1930 census, 40.7% of the farms of the nation cut timber products in 1929 of a total value of \$242,042,245, taken from $8\frac{1}{2}$ million acres; an average of \$1.82 per acre and \$54.60 for the average woodlot in 1929. When it is considered there are instances where farmers netted over 40 per acre from timber products, it is clear that attention paid to woodland management pays over and over again.

By selective cutting in mixed timber, income from woodlands can be increased, lumber of most desirable species to meet local markets be grown faster, and the perpetuation of the timber stands assured.

The importance of a well-managed timber stand in checking soil erosion and in helping to conserve adjacent lands for crop income, cannot be overrated.

BEAUTIFYING OF GROUNDS

People are not farming primarily for money - they are farming for a home, and this has to do with the entire domestic landscape. Farm beautification is a factor in erosion control that is all too much overlooked in the Deep River area; in other words, it has its economic as well as artistic aspects. Where the area around the farmhouse has been cleared of timber, very often erosion has the right of way in times of heavy rains.

Land around the farmhouse is not, in most cases, put to any commercial use, but protective erosion control measures could be used to beautify the area around the home. Some well-placed shade trees and plenty of shrubs, planted around the house and along the drives and walks, will check washoff, add humus to the soil and hold the land in place. This work can be done at little cost as the farmer can take advantage of native plants found in the area.

Hardwoods that make good shade trees can be collected on most farms, such as willow oak, sweet gum, and any of the maples. Where hardwoods do not grow well, any of the pines will make good shade trees, and among the many native shrubs available are coralberry, privet, gallberry, and burning bush. If a sod of Bermuda grass is available, this is unsurpassed for hot summer growth, and as a foundation for a good grass growth on areas from which the topsoil has been lost.

GOOD PASTURES ARE NEEDED BY CATTLE

If the farmer wants to keep his pasture from becoming a livestock gymnasium, and protect the soil from washing away, the application of these timely pasture hints is important:

1. Do not graze heavily in dry seasons.
2. Mow the woods and shrubs that rob moisture.
3. Let new seedlings make a good top growth before grazing.
4. Plant temporary pastures of Sudan grass, soybeans, cowpeas, etc., to tide the livestock over the entire season.

Cattle get plenty of exercise but produce little meat and milk from worn out pastures.

Properly managed pastures control erosion on sloping fields and produce the cheapest of all livestock foods. Over-grazed pastures are soon reduced to a playground for hungry cows and mules.

Good permanent pastures prevent losses of valuable topsoil and the formation of gullies. Together with trees, they represent the only natural and income-producing means for protecting slopes too steep for the production of clean-cultivated crops.

Therefore, if the farmer would have an abundant milk yield from well-fed, "contented" cows; and stock, brawny mules, capable of doing an honest day's work, it is imperative that he pay attention to the proper protection of his pasture lands.

HYDROLOGICAL DATA

The results obtained during the fifteen month period ending June 30, 1935, at the West Fork of Deep River station, show that the minimum flow occurred on July 20, 1934, when the average for the day was 34 gallons per second, and the amount of soil carried that day was 1,000 pounds. The maximum flow occurred on February 26, 1934, when the average flow for the day was 5,210 gallons per second, and the amount of soil carried that day was 15,820,000 lbs. For the entire fifteen months, the amount of soil carried was 43,135 tons.

The total land area from which rainwater drains into the river above this station is 35 square miles, or 21,120 acres, which means that approximately two tons of valuable topsoil per acre was forever lost from the land in the area during the fifteen month period.

Since more than a third of the above acreage is covered with timber from which little soil is lost, the loss per acre of valuable soils from cultivated lands was approximately three tons per acre for the period.

A large part of this washed away soil was deposited in the City Lake, thus decreasing its water storage capacity.

Similar results were obtained at the other stations.

(See article on "STREAMFLOW" on page 7)

VEGETATIVE CONTROL

Vegetative growth is Nature's method of controlling runoff and soil erosion. It is effective in controlling erosion chiefly through rainfall interception, in protecting land against the beating of heavy rains, by spreading the water to prevent concentration in channels, increasing the absorptive power of the soil and the effectiveness of the roots in holding the soil particles.

For interception of rainfall trees are the most effective vegetative cover, since the wide expanse of branches provides means of evaporating a large percentage of moisture into the air.

For protection against soil washing by heavy rainfall, the efficiency of any vegetative cover depends upon density, height and leafiness of the top growth. While grasses are important, forest cover is perhaps the most effective in affording protection.

To spread the runoff of rains and prevent concentration in gullies, herbaceous vegetation and grasses are particularly effective. Sod grasses are more efficient in this respect than bunch grasses. A vigorous stand of Bermuda grass makes an excellent binder for soils of the Deep River area. Its intricate network of roots, density of growth, and adaptability to any type of soils place it in the front rank of erosion resisting grasses. It is especially recommended for gullies and steep slopes in open areas, where other vegetation will not hold the soil.

THE LOWLY TOAD

Since the toad is largely nocturnal in habit and not highly colored, it is not generally observed like some of the birds and lizards that are conspicuous during the daytime. Very little damage is done by the toad. It is not a nuisance, and the common saying that it causes warts is false.

During the evening and night it will wander away from home, travel through tall weeds, impeding grass, or across waters, without much hesitation. The toad is constantly on the alert for insects, and can devour as many harmful insects in a single night as the ordinary bird can during the daytime.

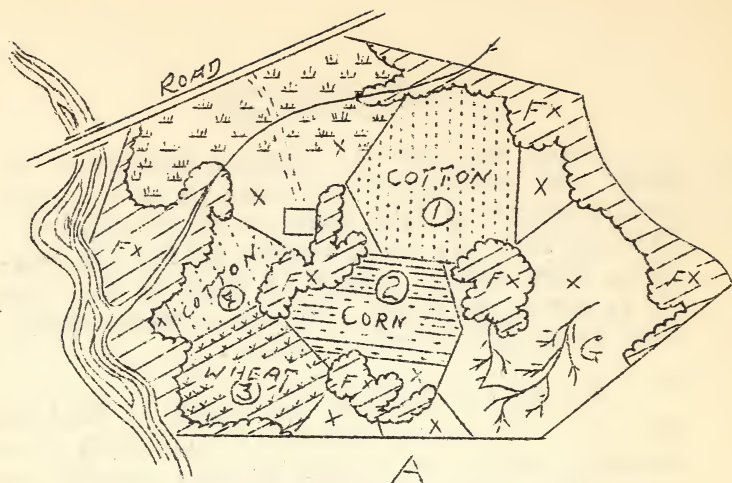
It may also be said; that while man sometimes reveals a suicidal tendency, this farmer's friend keeps on "croaking."

oo00oo

TERMITES

Damages of 50,000,000 have been attributed to termites in the United States. North Carolina Piedmont has suffered a goodly share of this damage. These destructive insects do not confine themselves to wrecking the foundations of the home and other farm buildings, but frequently attack garden plants.

Their work might be called another form of erosion. While water carries away the soil from which the farmer derives a living, the termite or white ant eats away from under him the place in which he lives.



This map represents a typical farm in North Carolina on which no thought has been given to a systematic planning for soil and water conservation. Erosion has caused heavy losses on this farm.

Fx represents land that has been in cultivation but due to erosion is now abandoned and grown up in brush.

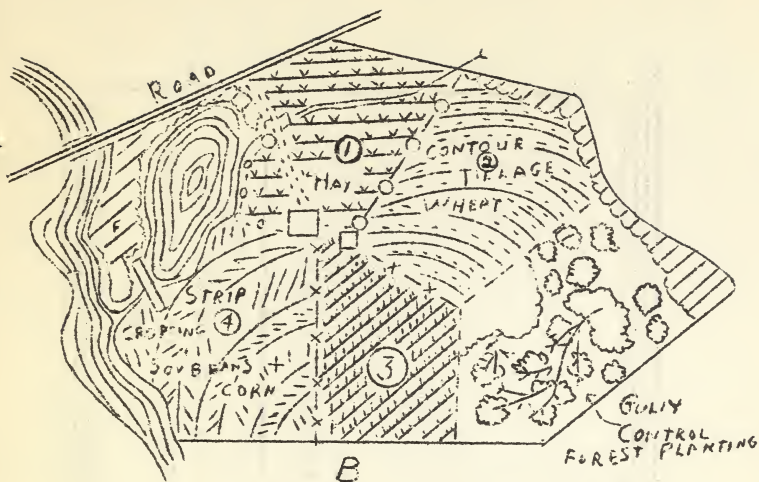
X represents idle land of which no use is being made.

All the fields 1, 2, 3, and 4 are planted continuously to crops with no thought of rotation to increase yields, or to save soil fertility, or the soil itself. Note the rows running up and down the hill.

W represents bottom land too wet to use for crops.

G represents gullies on which no control measures have been applied.

The entire layout of this farm shows neglect, carelessness, and lack of consideration for future generations.



This map represents the same farm as farm A, but has been arranged on a contour plan to conserve soil and water and, at the same time, utilize the soil to a better advantage and a greater profit.

Notice that the idle land on Farm A is now producing crops, except the gullied portion which is now in trees. The gullies have been treated and trees planted.

Field 1 is now in hay, producing the necessary hay for this farm, whereas on Farm A it was idle and in wet bottom land.

Fields 2, 3, 4 are now in a rotation of wheat, lespedeza, and corn in strips; all planted on the contour. The corn is rotated among the three fields and strip cropping is practiced on the field planted to corn. Other fields are planted solid to wheat or lespedeza as the case may be.

Care was taken in planning a program for this farm to have fields convenient to the home site.



UNITED STATES
DEPARTMENT OF AGRICULTURE
Soil Conservation Service
High Point, N. C.

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